

CLAIMS

1. Method of depositing an amorphous layer containing mostly fluorine and carbon on a substrate in a vacuum, characterized in that it includes a step of 5 depositing said layer by means of an ion gun adapted to eject ions in the form of a beam of accelerated ions created from at least one compound containing fluorine and carbon in gas or saturated vapor form fed to the ion gun.
- 10 2. Method according to claim 1, characterized in that the layer containing mostly fluorine and carbon is the low index exterior layer of an antireflection stack deposited on the substrate.
- 15 3. Method according to either claim 1 or claim 2, characterized in that the ion gun is fed with at least one compound containing fluorine and carbon mixed with oxygen or at least one rare gas.
- 20 4. Method according to any one of claims 1 to 3, characterized in that the ion gun is fed with at least one aliphatic or cyclic fluorocarbon compound, at least one aliphatic or cyclic fluorinated hydrocarbon, or a mixture thereof.
- 25 5. Method according to claim 4, characterized in that the ion gun is fed with perfluorocyclobutane ( $c-C_4F_8$ ) or a mixture thereof with at least one other fluorocarbon compound, in particular tetrafluoromethane ( $CF_4$ ) or hexafluoromethane ( $C_2F_6$ ), or at least one rare gas.
- 30 6. Method according to any one of claims 1 to 5, characterized in that the substrate is a plastics material substrate.
7. Method according to claim 2 and any one of claims 3 to 6, characterized in that it consists in fabricating an antireflection stack by the following steps:
  - 35 - physical vapor-phase deposition (PVD) in a

vacuum of three layers respectively having, from the interior toward the exterior, a high refractive index/a low refractive index/a high refractive index, preferably of the type  $ZrO_2/SiO_2/ZrO_2$ ;

5 - depositing the amorphous external layer containing mostly fluorine and carbon using the ion gun.

8. Method according to claim 7, characterized in that each *in vacuo* PVD step includes evaporation by electron bombardment of the material to be deposited.

10 9. Method according to claim 7 or claim 8, characterized in that each deposition step is carried out at a pressure less than or equal to  $10^{-2}$  Pa.

15 10. Use of the method according to any one of claims 1 to 9 to improve the adhesion of a low refractive index exterior layer to the underlying layer of an antireflection stack.

11. Device suited to carrying out the method according to any one of claims 1 to 9 and including:

20 - an ion gun (1);  
- means (7) for feeding the ion gun with a compound containing fluorine and carbon; and  
- a substrate holder (3) above the ion gun.

25 12. Device according to claim 11, characterized in that the ion gun includes an annular anode (4), a filamentary cathode (5) extending diametrically above the annular anode, and a magnet (6) below the annular anode.

13. Device according to claim 12, characterized in that the ion gun (1) includes a gas distributor (2) between the annular anode and the magnet.

30 14. Device according to claim 12 or claim 13, characterized in that it includes a chamber (8) in which the ion gun (1) and the substrate holder (3) are accommodated and a pumping system (11) for evacuating the chamber.

35 15. Device according to claim 14, characterized

in that it includes a cold trap adapted to increase the water pumping rate.

16. Device according to any one of claims 11 to 15, characterized in that it includes an electron gun  
5 (12) for evaporating by electron bombardment the materials to be deposited.